Developing Complex Video Workflows With Final Cut Pro and XML

Session 301

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Apple Applications

Developing Complex Video Workflows With Final Cut Pro and XML

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Introduction

- Leveraging open data formats for flexible and extensible workflows
  - Introduction to common post production data formats
  - Using XML to interchange data with Final Cut Pro
  - Creating custom workflow tools

Before We Begin…ProApps in 2005

What You'll Learn

- A brief introduction to industry standard data interchange formats
- Interchanging project data with Final Cut Pro
- Creating workflow tools using Final Cut Pro and XML

Project Data Interchange Formats

Project Data Interchange Formats

- What is project data?
  - The structure that ties media elements together
  - The data that users spend most of their time creating
  - Traditionally difficult to exchange beyond the basics

Project Data Interchange Formats

- Legacy Data Exchange Formats
  - Designed 15-20 years ago
  - Oriented towards hardware based, tape to tape production systems
  - Examples
    - Batch Lists
      - Simple lists of clips/segments indexed using timecode
    - EDLs (Edit Decision Lists)
      - Tape-based switcher control files, stored as plain text

Project Data Interchange Formats

- Contemporary Data Exchange Formats
  - Created to replace legacy formats, and address modern system capabilities
  - Based around binary container formats, not editable by users
  - Complex to parse and generate, requires specific libraries/tools
  - Examples
    - OMF
      - Created as a common file format for AVID products, primarily used by ProTools today
    - AAF
      - Created by an industry consortium as a data exchange format for post production applications

Project Data Interchange Formats

- Open Data Exchange Formats
  - Created to replace legacy formats and address shortcomings of contemporary formats
  - Open access to ALL data, both in storage and structure
  - Can be designed to be easy to parse and generate

Data Interchange With Final Cut Pro

Data Interchange With Final Cut Pro

- Solving the interoperability problem
  - Customer Feedback
    - Support for common data formats used in the industry
    - Need for access to the contents of projects
    - Need to integrate FCP into custom processing pipelines
  - Developer Feedback
    - Ability to interchange data with Final Cut Pro
    - Desire to write new tools/extensions for Final Cut Pro
    - Need to integrate into custom processing pipelines

Data Interchange With Final Cut Pro

- Solving the interoperability problem
  - A different take on the problem
    - Not merely interchange between systems
    - Allow power users and developers to access data
    - Minimize library/tool requirements
    - Long term archival of projects

Data Interchange With Final Cut Pro

- The Final Cut Pro XML Interchange Format
  - Introduced with Final Cut Pro 4
  - Encoded using XML
    - Easy to parse and generate using standard tools
    - Viewable and editable as plain text
  - Complete contents of a Final Cut Pro project
    - Self documenting data structures
    - No “black” data allowed

Data Interchange With Final Cut Pro

The Final Cut Pro XML Interchange Format

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE xmeml>
<xmeml version="0.5">
    <clip id="Clip1">
        <name>Clip1</name>
        <duration>17982</duration>
        <rate>
            <ntsc>TRUE</ntsc>
            <timebase>30</timebase>
        </rate>
        <in>5484</in>
        <out>9082</out>
        <timecode>
            <string>01:00:00;00</string>
            <frame>107892</frame>
            <format>DF</format>
            <source>source</source>
            <reel>
                <reelname>001</reelname>
            </reel>
        </timecode>
    </clip>
</xmeml>
```

Data Interchange With Final Cut Pro

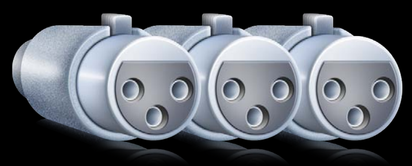
- The Final Cut Pro XML Interchange Format
  - Designed to be a superset of other formats
    - Exposing complete contents allows for full interchange with other systems, regardless of their capabilities
    - Internal support for other interchange formats (e.g. AAF) built using XML
  - An archivable format
    - Self documenting
    - No specific library or platform requirements
    - Accessible using XML parsers or as plain text

Data Interchange With Final Cut Pro

- The Final Cut Pro XML Interchange Format
  - Who is using it today?
    - Automatic Duck, Gallery Systems—Avid/FCP Interchange Tools
    - Building 4 Media—Asset management, broadcast automation
    - Grass Valley—Broadcast server integration
    - Siemens—Workgroup editing combining FCP with Colledia
    - Silicon Color—FinalTouch Color Grading integrated with FCP

Data Interchange With Final Cut Pro

- The Final Cut Pro XML Interchange Format
  - Version 1—Supported in FCP 4.1, 4.5 and 5.0
  - Version 2—Supported in FCP 5.0
    - Added support for new features
      - Multi camera editing (multiclips)
      - Multichannel audio
      - Film data



It’s All About Workflow…

Creating Lightweight Workflow Tools

Creating Lightweight Workflow Tools

- What are lightweight workflow tools?
  - Quick to build
  - Simple in structure
  - Built for specific tasks
  - Easy to customize
  - Creatable by power users as well as developers
- Commonly used development tools
  - Perl
  - AppleScript
  - Automator

Creating Lightweight Workflow Tools

- Examples
  - Automating creation of short interstitials (bumpers) for movies (e.g. now playing, coming up, etc…)
  - Adding text overlays to existing content
  - Extracting useful information from projects

Demo

Creating lightweight workflow tools

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Creating Sophisticated Tools Using XML

- More Advanced Capabilities
  - Generation of XML from scratch
  - Translating data from other sources
- “Mini-applications”
  - UI Tailored to specific user needs
  - Making complex tasks easy for users
- Built using traditional developer toolsets
  - XCode and Interface Builder
  - C, C++, Objective C
  - Cocoa, Core Foundation, Core Data, libxml2

Demo

Creating Sophisticated Tools Using XML

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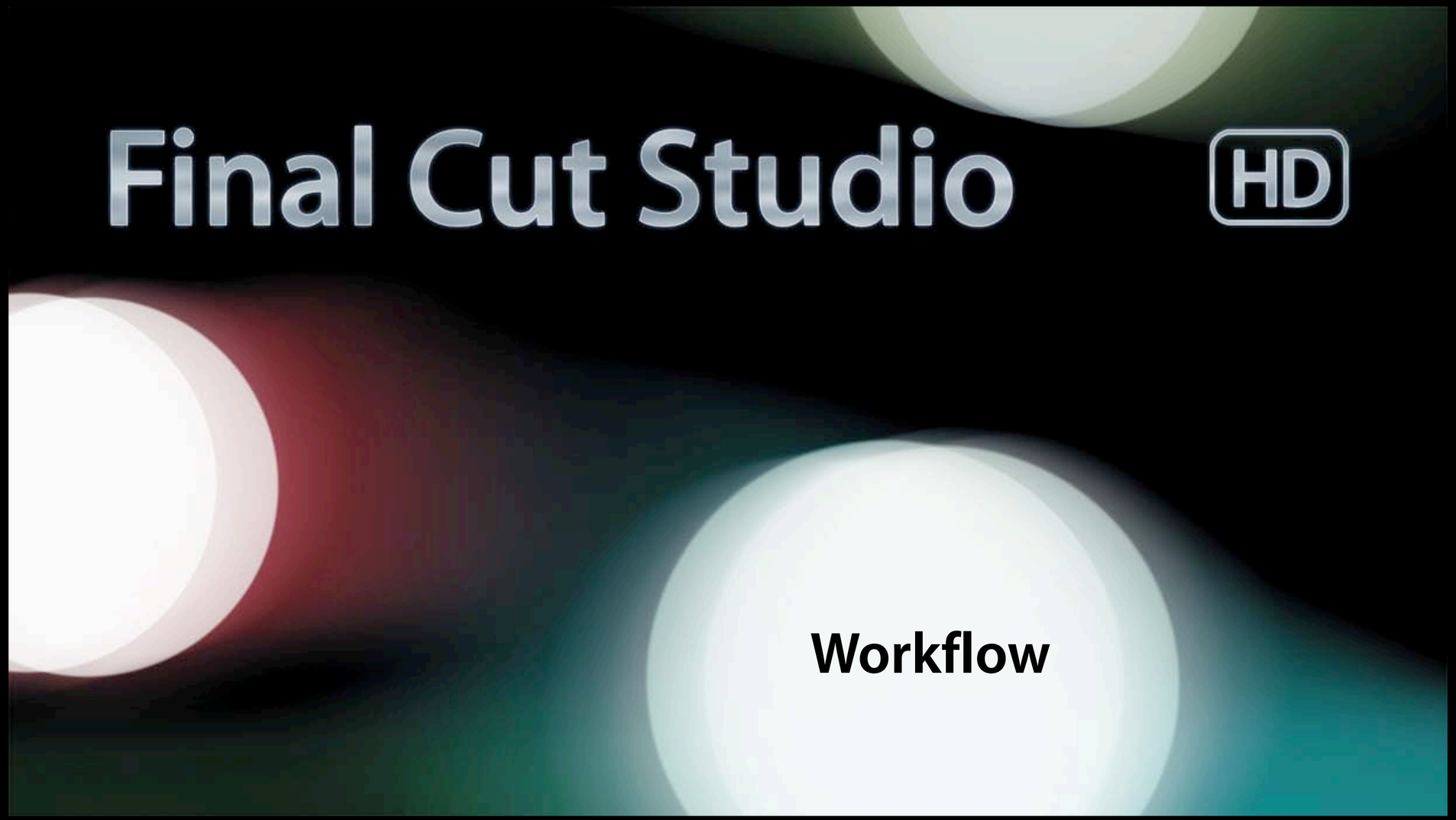
Summary



Summary

- Enabling a wide range of workflow oriented tools and applications
  - Open data formats allow for maximum flexibility
  - Linking multiple applications allows for powerful custom workflows
  - The simplest development tools can produce powerful results
  - Use traditional development tools to build complex applications

Summary

- Simple Tool Possibilities
  - Data extraction
  - Template based media generation
  - Subtitle generation/automation
- Sophisticated Application Possibilities
  - Asset/media management tools
  - Production database
  - Data importers/exporters

More Information

http://developer.apple.com/wwdc2005/

Documentation, Sample Code, and Other Resources

http://developer.apple.com/wwdc2005/

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